

Article

Worlds of Meaning at the Edge of Extinction: Conservation Behaviour and the Environmental Humanities

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Abstract: We are living in the midst of a period of mass extinction. All around us, diverse species of animals and plants are disappearing, often largely unnoticed. However, this is also a period in which, on a daily basis, new and fascinating insights into animal life are emerging as we come to appreciate more about their remarkable perceptual, cognitive, social, and emotional lives. This article explores this strange juxtaposition of loss and knowledge-making and the many challenges and possibilities that it gives rise to. It focuses on the emerging field of Conservation Behaviour in which researchers are seeking to modify or manipulate animal behaviours to achieve conservation outcomes: for example, teaching lizards not to eat toxic prey, or birds to utilise a safer migratory route. The article seeks to bring this approach to conservation into dialogue with work in environmental humanities, including the emerging paradigm of conservation humanities. The article outlines an interdisciplinary environmental humanities approach to conservation behaviour, grounded in work in multispecies studies and philosophical ethology. It then explores four broad thematic areas—agency, identity, ethics, and loss—in which the dialogue between these two fields might prove to be particularly, and mutually, enriching.

Keywords: conservation; biodiversity; extinction; multispecies studies; philosophical ethology; environmental humanities; ethics; loss



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1. Introduction

On the South Island of Aotearoa-New Zealand, a group of scientists is engaged in an effort to teach the local cats, hedgehogs, and ferrets to ignore the tasty eggs of the various species of ground-nesting birds around them. These scientists have deployed a carefully planned program of ‘olfactory camouflage’. In practice, this involves walking around the landscape while dolloping blobs of Vaseline that have been infused with the scent of birds. As the various predators in the area explore the scent in search of a meal, they gradually learn that this cue is no longer a reliable indicator of food and begin to ignore it (Norbury et al. 2021). When the real birds arrive in the area to start nesting a couple of weeks later, they can do so with far less predation pressure. As a result of this work, the conservation of these birds may one day no longer require people to shoot, trap, poison, or otherwise kill their predators.

All over the world, similar projects are emerging under the umbrella of ‘Conservation Behaviour’, a field in which the sciences of animal behaviour are being put to work to achieve conservation outcomes. In many cases, researchers are quite literally teaching animals to live in new ways for their own, or others’, survival. Over roughly the past two decades, these efforts have included everything from training captive-bred wallabies to recognise and avoid the predators they will encounter after release, to the retrofitting of train tracks with devices that effectively communicate to bears that it is time for them to move out of the way (Griffin et al. 2000; Greggor et al. 2020). In other cases, scientists have sought to develop ‘bio-fences’ that use scent markers to communicate to wolves, African wild dogs, and other predators that another pack occupies the neighbouring territory and

they should stay away, ideally within a protected area where they are less likely to end up in conflict with local people (Snijders et al. 2019). In yet another fascinating project taking place in Western Australia, scientists are working to teach lizards, crocodiles, and other species not to eat the highly toxic cane toads that are moving into their habitat. Through a program of ‘conditioned taste aversion’, in which predators are exposed to small toads or cane toad sausages that make them very ill but do not kill them, they learn to steer clear of these animals (Ward-Fear et al. 2020; Aiyer et al. 2022).

Some of the conservation approaches being developed here are providing new opportunities for non-lethal management, while others are increasing survival rates for endangered species. However, this is space of innovation is far from being Edenic. New forms of control, harm, and killing are also emerging. For example, scientists are currently also putting behavioural insights to work to produce more effective traps that can better target those cautious individuals that might warily avoid, and so escape, these devices (Garvey et al. 2020).

Despite their many differences, these projects are united in their effort to develop conservation interventions that take better account of how animals perceive, understand, and navigate the world around them, while often also actively altering and reshaping those ways of being. While there are certainly scattered examples of these kinds of efforts throughout the history of the modern conservation movement, something has changed in recent decades. The origins of the field of conservation behaviour are generally traced by its practitioners to the late 1990s, with a particular growth in momentum over the past ten years during which efforts have been made to create overarching frameworks, systematic reviews, and a sustained conversation with conservation practitioners (Berger-Tal et al. 2019; Greggor et al. 2020).

This article explores a possible role for environmental humanities scholars in grappling with this emerging field. On the surface, conservation behaviour might appear to be a somewhat niche branch of the conservation sciences. It is one, however, that offers a particularly instructive vantage point on a range of pressing questions about how diverse human communities understand, value, and live with other animals in a period that is increasingly being understood to constitute the planet’s ‘sixth mass extinction event’ (Ceballos et al. 2015). Of particular note is the way in which these behavioural conservation interventions potentially interrupt and unsettle a long history in the conservation sciences of largely ignoring animal behaviour, not to mention the broader agentive and creative lives of animals. By and large, conservationists have understood their mission to centre on the preservation of biogenetic resources—genes, species, ecosystems, perhaps landscapes—and have ignored the rest (Caro 2007; Brakes et al. 2019). Where animals or their impacts have needed to be managed, the key mechanism for doing so has generally been to increase or decrease their populations, usually through habitat modification or targeted programs to increase reproduction or survival, or to increase mortality (usually referred to as ‘lethal control’). In contrast, changing the behaviours of these animals has rarely been considered as a site for active intervention. Nonetheless, it is important to note that conservation efforts have frequently ended up impacting animals’ behaviours and subjectivities in a range of ways, more or less intentional and desirable (Chrulew 2020; van Dooren 2016). As such, what is of particular interest in the field of conservation behaviour is not that its practitioners are intervening in animal behaviours and lives, but that they are doing so *deliberately*, as a central component of their conservation efforts, and that in so doing they are drawn into a host of new questions and possibilities for knowing, conserving, controlling, and reshaping, diverse nonhuman animals and their relationships with a wider world.

In this context, it is significant that over the past five to ten years, some of these behavioural projects have been scaled-up to become landscape-level interventions. While previous applications of conservation behaviour research tended to be small in scope—focusing on things like predator avoidance or migration training for a specific captive-bred population of an endangered species prior to their release—projects like the olfactory

camouflage of ground-nesting birds mentioned above are seeking to intervene in the behaviours of large groups of free-living animals. As Catherine Price, one of the scientists behind this olfactory work, put it to me in an interview, these ‘free-ranging applications are the next big challenge for conservation behaviour’. These larger-scale programs create a variety of new difficulties and opportunities. In particular, they must now often grapple with many more of the complexities of the wider world. This includes the responses of a variety of ‘non-target’ animal species that might become caught up in these efforts in one way or another. Importantly it also includes a broad range of human communities, from hunters and farmers to animal activists and Indigenous peoples, who have their own ideas about how these animals make sense of and navigate the world, as well as their own practices for intervening in animal lives to achieve their desired outcomes.

While there are many ways in which scholars in the environmental humanities might seek to engage with work in conservation behaviour, the particular approach developed in this article is grounded in the fields of multispecies studies and philosophical ethology. This approach is outlined in more detail in the first section of this article. At its core is an effort to study the entangled lives of humans and other animals in a way that attends not only to their biological, ecological, and cultural interactions and relationships, but also to the worlds of ideas, understandings, and meanings that animate and guide them. This is an approach that is necessarily multidisciplinary, drawing the biological sciences (especially the ecological and behavioural sciences) into dialogue with the humanities (especially philosophy, anthropology, and science and technology studies), in specific sites (informed by ethnographic and textual research). This approach sits comfortably under the broad umbrella of the environmental humanities, while also aligning with many of the central concerns of this special issue and the emerging paradigm of ‘conservation humanities’.

The second section of this article focuses on four broad thematic areas in which a collaborative dialogue between the environmental humanities and conservation behaviour might be mutually enriching: agency, identity, ethics, and loss. Each of these themes represents a space in which dominant Western scientific and cultural understanding and practices in relation to conservation and extinction might be—and indeed must be—challenged in our current time. Ultimately, I aim to show that a dialogue between environmental humanities and conservation behaviour around these four themes can offer valuable insights for this field of conservation research and practice at this critical point in its emergence, while also generating new understandings of animal life and new possibilities for a shared life in diverse more-than-human communities.

2. The Environmental Humanities and Conservation Behaviour

Conservation humanities, like the broader field of environmental humanities, has a rich and diverse set of disciplinary and interdisciplinary approaches available to it, from history, literature, and philosophy, to anthropology, gender studies, Indigenous studies, and science and technology studies (Heise et al. 2016; Bergthaller et al. 2012; Neimanis et al. 2015). Each of these (inter)disciplinary approaches offers different methods and concepts. As I have argued elsewhere, I am of the view that the environmental humanities should be more than an umbrella that collects up different environmentally focused subdisciplines, leaving them largely unchanged by the process. While there is certainly some value in this, I believe that the field has the most to contribute when it is understood as a gathering ground upon which new interdisciplinary questions, collaborations, and approaches are being imagined and crafted, often in dialogue with the sciences and with broad publics beyond the academy’ (van Dooren 2018).

In the area of conservation and extinction, foremost amongst the offerings that the humanities (and the qualitative social sciences) can make is the capacity to draw out the ‘thick’ worlds of meaning, value, and commitment that animate human life, and to critically interrogate the larger historical, cultural, economic, political, and environmental contexts that ground these realities. This is the central preoccupation of the humanities, and it is one that actively resists efforts to reduce the understandings, actions, and indeed lives

of diverse human beings to the simplistic economic and/or psychological models that frequently guide policy and other decision-making (Rose et al. 2012; Sörlin 2012). The environmental or conservation humanities are, of course, about the application of such an approach to these respective domains. Crucially, however, this does not mean that these fields are focused on the ‘human dimensions’ of environmental or conservation challenges. Rather, in developing approaches in these domains, the humanities themselves must be unsettled, stretched, and redone (Rose et al. 2012).

Refusing the division of labour, and of the world, into two camps—the ‘ecological/natural dimensions’ and the ‘human dimensions’—work in these fields insists on the cultivation of new modes of working across these divides. This will often require humanities scholars—who are definitively no longer ‘humanists’—to gain proficiency in ways of knowing beyond their disciplinary training (including those of the natural sciences), while also collaborating on finding ways to engage and include other pieces of knowledge and expertise that they cannot personally acquire (whether, for example, for reasons of practicality or cultural prohibitions). Furthermore, it insists that the framing of ‘human dimensions’ is itself deeply unhelpful. Firstly, this is because humans are tangled up in ‘natural’ systems in such complex ways that any effort to understand them, let alone manage them, discretely is bound to cause at least as much harm as good. Secondly, because there has never been a default, generalisable ‘human’. Human beings and human communities are implicated in and impacted by ‘environmental issues’ in a diverse array of different ways. When we focus on ‘the human’, this diversity often becomes homogenised or glossed over in ways that further entrench inequalities. As a result of these dynamics, it does not seem unreasonable to insist that a key part of our current period of nested eco-social crises is precisely this tendency to divide the world and our problems into their ‘human’ and ‘natural’ dimensions.

In contrast to such a division, the approach to conservation behaviour outlined in this article is multidisciplinary, working across diverse modes of knowing. More specifically, it is situated at the intersection between two important emerging subfields of research in the environmental humanities that have been at the core of my own research for the past decade. The first of these fields is multispecies studies, which draws in particular on ethnographic research to explore people’s entanglements within a more-than-human world, emphasising the ways in which the lives and possibilities of diverse beings are co-shaped, and paying particular attention to questions of ethics and responsibility (Kirksey and Helmreich 2010; Locke and Münster 2015; van Dooren et al. 2016). The second key field is philosophical ethology. Work in this area has explored the philosophical and historical underpinnings of the ways in which scientists (and to a lesser extent farmers, animal trainers, and other interested peoples) construct understandings of animal experience and behaviour, drawing on sources that range from continental philosophy to work in cognitive biology and neurobiology. Research in this field is generally grounded in close engagements with the scientific literature and/or ethnographic research with scientists themselves (Buchanan et al. 2014; Lestel et al. 2006; Despret 2016).¹

In applying such an approach to the field of conservation behaviour, we might begin with the scientists and conservationists who are generally, but not always, the ones initiating these projects. How are these people grappling with, and developing frameworks for, the application of behavioural approaches to conservation? Through this practical focus, how are scientists learning about how diverse animals make sense of and navigate their worlds? In exploring these scientific knowledge-making practices in the laboratory, the field, and elsewhere, we might conduct what Vinciane Despret has called an ‘ethology of the ethologists’ (Despret 2021). Importantly, while much of this scientific work is framed in terms of a focus on animal ‘behaviour’, the writings of Despret and others allow us to explicitly challenge approaches that reduce ‘animal life to behaviours’ (Lestel et al. 2014, p. 127). Indeed, this is a challenge that is also frequently happening *within* the natural sciences today. While there are certainly long histories and entrenched practices of behaviourism in many parts of the academy, there are also a range of other approaches

that are actively exploring the rich and diverse cognitive, emotional, and social lives of animals.² In place of mere behaviour, this philosophical and scientific work helps us to appreciate the broader *worlds of meaning* that nonhuman animals craft, interpret, and live and act within (which, depending on the animals in question, may or may not include particular forms of sentience, intentionality, and subjectivity).

In attending to animal life in this way, we can explore the active role that the animals caught up in these conservation processes play through their particular modes of perceiving, learning, and adapting. For example, in the development of the above-mentioned conditioned taste aversion to cane toads, what differences exist between how yellow-spotted monitor lizards and blue-tongued lizards learn about the dangers of toads? In this case, it seems that one fascinating difference is that while the latter lizard can learn this lesson through exposure to a nauseating sausage made from cane toad meat, the former lizard requires an encounter with a live toad (Ward-Fear et al. 2017; Price-Rees et al. 2011). Furthermore, amongst the monitor lizards, why do some individuals learn more readily than others in certain conditions, and how are these differences mapped onto what the scientists refer to as the ‘personality type’ of these individuals, i.e., whether they’re bolder or shier? (Ward-Fear et al. 2020). These are complex spaces of (only ever partially) shared intelligibility in which scientists are deploying practices ranging from imagination and intuition to lab and field experimentation to better understand how animals make sense of their worlds. Importantly, these efforts are highly consequential ones, with possible outcomes that include everything from death by poisoning, predation, and starvation, to the survival of individuals and their species.

Importantly, as these conservation efforts travel out into the wider world, a number of other human communities become caught up in them: from the people losing sheep or cattle to predators who evade a biofence, to architects working to integrate the elusive nocturnal movements of bats into a bridge design. These larger webs of relationship are a key part of the environments in which these emerging approaches are both tested and applied; processes that frequently take place simultaneously in a kind of ‘wild experiment’ that blurs the distinction between research and application (Lorimer and Driessen 2014). In sites around the world where conservation behaviour interventions are being deployed, a variety of humans and animals are developing new approaches to understanding one another’s movements, motivations, and agendas. These are ‘hybrid communities comprised of humans and animals sharing meaning, interests and affects’ (Lestel et al. 2006, p. 155).

In drawing these broader contexts into the frame, an environmental humanities approach can explore the tangled stakes and possibilities that arise here. For example, in the context of a biofence to protect livestock or crops from wildlife, and so these wild animals from the reprisals of farmers, how do these diverse humans and nonhumans understand and navigate spaces of shared learning and response? What is at stake here, beyond the conservation of predators, including the lives, deaths, traumas, farming practices, and livelihoods of local people and their ‘domesticated’ animals?³ How do diverse knowledges about animals come into dialogue: as when the expertise of San trackers is called upon to interpret the tracks of African wild dogs around the edges of a bio-fence (Pierre du Plessis, pers. comm.), or when Kenyan farmers, knowing that elephants avoid bees, suggest the development of ‘beehive fences’ to keep these large herbivores out of their crops (King 2021). Most fundamentally, how might attend to these questions *together*—the epistemic and the socio-ethical, the ethnographic and the ethological—enrich our understandings and our possibilities?

In keeping with well-established practices of scholarship in feminist science and technology studies (STS)—which have now thoroughly infused much of the environmental humanities—we might understand this research as a work of ‘ethico-onto-epistem-ology’ (Barad 2007, p. 185) that attends to the many consequences, the human and other-than-human lives and worlds that are brought into and out of being, as a result of particular ways of understanding, classifying, ordering, and knowing. In short, in bringing the methods and concerns of multispecies studies and philosophical ethology into dialogue around

specific conservation behaviour interventions, an environmental humanities approach might foreground the ways in which diverse humans—including biologists, farmers, city planners, and Indigenous communities—are working to understand and respond to animal behaviours to achieve conservation outcomes. At the same time, however, it would attend to how these animals are themselves engaged in processes of learning and adaptation, and are trying to make sense of and navigate changing environments and conservation approaches. In this way, it might explore the *shared, partially overlapping, worlds of perception, experience, and meaning* that are crafted and inhabited by humans and other animals; spaces in which living beings are adaptively (re)learning to relate to one another, to make sense of one another, and hopefully to survive and thrive with one another.

This is an approach that builds on the significant contributions of scholars such as Lestel, Despret, Tim Ingold (Ingold 2013), and others who have sought to explore the shared worlds of meaning of animals and humans through what Lestel and colleagues have called an ‘etho-ethnological’ inquiry (Lestel et al. 2006). Despite years of calls for such research, and some innovative endeavours undertaken, it remains the case that there are very few detailed empirical studies of this kind.⁴ One of the key reasons for this is the broad, multidisciplinary nature of these inquiries, which require detailed knowledge of the behavioural, ecological, and conservation sciences, as well as the capacity to engage with them philosophically and historically. These knowledges must also be brought into dialogue with ethnographic methods and the capacity to navigate complex spaces of cultural difference, including competing livelihoods and understandings.

In this respect, however, it seems that a focus on the field of conservation behaviour might provide important opportunities for environmental humanities researchers. Many of the conservation behaviour interventions being developed around the world are active sites of ongoing animal behavioural research (which is very rarely the case in wildlife management contexts, and certainly not in a detailed manner). As a result, environmental humanities researchers might find fruitful opportunities to engage with behavioural scientists who are already working in the field and are required to grapple with the needs, values, and understandings of local communities. As such, environmental humanities scholars working in this space would not need to conduct their own empirical studies of animal learning and behaviour, and may well find willing scientific and community partners for dialogue and/or collaboration.

3. Areas of Productive Exchange: Redoing Conservation

The final section of this article is structured around four key analytic themes: agency, identity, ethics, and loss. As noted above, each of these themes represents a space in which dominant Western scientific and cultural understanding and practices in relation to conservation and extinction are being challenged in our current time. As is detailed further below, some of these understandings are already being questioned in a variety of ways within the conservation community, the environmental humanities, and in broader popular and policy discussions that have been prompted in large part by the immense scale of current processes of biodiversity loss. As such, these themes do not represent areas for ‘rethinking’ so much as active spaces of ‘redoing’, in which understandings and practices are already being altered in highly consequential ways. Through the development of a focus on worlds of meaning at the edge of extinction, scholarship in this area might seek to intervene in these processes, practices, and relationships in order to create new possibilities for shared life in diverse more-than-human communities.

3.1. Redoing Agency

The first of these domains is that of animal agency. At the broadest level, this is a space of inquiry concerned with how and why animals do what they do: what kinds of attributes and competencies do various animals have as actors, how can we know this in each case, and what differences do different modes of understanding animal life make for all of us? These are big, complex questions. However, they are ones in which work in the field of

conservation behaviour opens up new opportunities for engagement from the humanities, especially when this work is understood in the context of a longer history of conservation practice.

Consider, for example, a now well-known example from the 1980s in which a series of efforts were made in Israel to release Northern Bald Ibises that had been bred in captivity back into the environment. All of them failed spectacularly, with released birds reported to have become ‘disorientated’ and ‘emaciated’, with most of them subsequently dying (Bowden et al. 2007, p. 2). It would be one thing if this were an isolated incident, but the sad reality is that it is far from it. All around the world during this period, captive breeding and release programs began to emerge as a popular option to help stem the loss of endangered species (Cade 1986; Snyder et al. 1996). Initial releases of a range of species—including Whooping Cranes and California Condors, Golden Lion Tamarins, and Black-Footed Ferrets—met similar fates. In all of these cases, animals were born or hatched in captivity to be reared by humans. However, their upbringing produced individuals who did not know what to eat or where to find it; how to fit into the social structures of their species; how or where to migrate; and/or about the dangers that they ought to avoid (van Dooren 2014; Chrulew 2017b).

How are we to understand these widespread failures? How can we reconcile this sad situation with what is now known—and indeed, was known then—about animal behaviour, namely, that it is not all ‘hard-wired’ or ‘instinctive’? Since at least the early 1950s, with Daniel Lehrman’s (Lehrman 1953) important critique of Konrad Lorenz’s sharp distinction between innate and acquired behaviours, the many issues associated with failing to attend to the developmental environment of animals have been widely accepted. Yet, many conservation projects—in the past, and to a lesser extent still today—rear captive animals in environments that bear little resemblance to their release sites, and as such fail to facilitate these developmental processes. In so doing, they focus on maintaining genetic diversity over behavioural competency.

It is hard to avoid the conclusion that these programs operate with an impoverished notion of animal life, one that might somewhat simplistically be characterised as ‘mechanistic’. The historical roots of such an understanding have been explored extensively, including the particular forms that they have taken in Western science from the 17th century to the 20th: from clockwork animals, through psycho-hydraulic models, to contemporary forms of genetic determinism (Burkhardt 2005; Daston and Mitman 2005; Riskin 2016; Crist 1999). In varied ways, and with differing degrees of credibility, these more mechanistic frameworks have tended to view animal behaviour as primarily ‘reactive’—driven by various kinds of ‘push-me-pull-you’ processes (Riskin 2020)—in a way that either denies or simply brackets out (ignores) any fuller sense of the diverse forms of experiential, adaptive responsiveness found among nonhuman animals.

Current efforts in conservation behaviour push against these simplistic framings. In different ways, these projects require scientists to rethink who animals are, as well as who they might become: what they might be rendered capable of in changing environments with novel possibilities for life and learning (Despret 2016). Part of what is at issue here is how different animals perceive their worlds and act in them differently on the basis of the biological and sensory capacities of their particular species (Greggor et al. 2020). However, in many cases these conservation behaviour interventions also require scientists to ask about the particularities of individual animals: how members of the same species might live and act differently, in part at least as a result of their unique experiences, life histories, and personalities (Garvey et al. 2020).

In this context, an environmental humanities engagement with the field of conservation behaviour might offer important new insights into the forms of animal agency at work in conservation efforts, past and present. How has conservation biology arrived at its particular understanding of the agential and perhaps experiential lives of animals? How and why were these elements of animal life sidelined within conservation in the first place, and how are those views being challenged today, albeit slowly and unevenly? In

taking up these questions this work might interrogate the forms of animal agency at work in conservation as scientists explore diverse sites of learning, memory, communication, and adaptation. Moving beyond scientific discourse, it would also ask how these insights are redone in the field as diverse interested members of local communities add their own understandings of who animals are and why they do what they do.

Research in this area might contribute to the significant ongoing discussions of agency in the humanities, in particular, to work in posthumanisms, animal studies, new materialisms, and STS, which focuses on the problems and promises of recognising diverse forms of agency in all manner of entities (Bennet 2010; Latour 2005; Robbins 2007; Barad 2003). What do such approaches enable us to see, and what ‘thicker’ forms of subjectivity do they perhaps cover (Braidotti 2013)? What might research in conservation behaviour contribute to these discussions? For example, do perception and learning *require* a conscious, experiencing, subject (many cognitive scientists think not, but humanities discussions sometimes assume so)? What other possibilities are there for imagining and communicating the *diverse* forms of agency found within the animal kingdom? More broadly, what might humanities scholarship contribute to emerging conservation practices? For example, work on subjectification helps to challenge the simple notion that a better understanding of animal cognition will somehow necessarily lead to improved care. Instead, as Matthew Chrulew has argued, it can often lead to new and more intense modes of surveillance, control, and domination (Chrulew 2017a). Indeed, we are already seeing this with emerging efforts to improve the efficiency of conservation actions by targeting particularly problematic individuals or personality types: for example, in a proposal to identify and ‘cull’ problematic California sea lions so they cannot spread their practice of consuming endangered salmon (Schakner et al. 2016). This situation, of course, also opens up challenging new ethical questions (discussed further below).

3.2. Redoing Identity

Within contemporary conservation there is a growing critique of notions of pristine nature and wilderness, alongside increasing calls for the development of new forms of ‘conservation after nature’ (Lorimer 2015) that consider, value, protect, and even actively create a variety of more ‘humanized’ environments through projects of restoration, rewilding, de-extinction, and more (Jørgensen 2019; Friese 2013; Lorimer and Driessen 2014). These approaches have been celebrated by some and strongly opposed by others (Miller et al. 2011; Wuerthner et al. 2014; Sullivan 2006; Collard et al. 2015; Buscher and Fletcher 2020). While there are many complex elements to this debate, one central point of contention is how to understand and articulate the goals of conservation outside of any notion of a static, pristine, nature that might be preserved or returned to. If the goal can no longer be ‘human-free nature’, then what kinds and degrees of human presence and intervention are acceptable?

This question takes on a particular, fascinating form in efforts to engage with animal behaviour for conservation purposes, requiring us to critically interrogate *what* it is that we are trying to conserve. Around the world, as conservationists consider and actively pursue programs aimed at deliberately altering all manner of animal behaviours—from the habitats they prefer to occupy and the foods they eat, to their migratory impulses and their tolerance for people—they open up new questions about species identity and the kinds and degrees of human intervention in animal lifeways that can, or should, be accommodated within conservation efforts (Reinert 2013). At what point is a species so transformed that it has not been ‘conserved’ at all (van Dooren 2016)? While in some cases these changes might be relatively short term—lasting only the lives of those individuals who were subject(ed) to the particular intervention—in other cases they have been far more enduring, as one generation of animals teaches them to the next, incorporating the new behaviour into the species’ way of life (for example, through the social transmission of a new migratory route or feeding behaviour).

In this context, environmental humanities researchers might explore how notions of identity are being challenged as a result of conservation interventions into animals' behaviours. How are these possibilities articulated and navigated by conservationists? Equally as importantly, how should they be? In taking up these questions, we might contribute to broader discussions in the environmental humanities that have explored concepts of fixity and change in environmental thinking to challenge static, ahistorical understandings of how an environment should be and associated conservation goals (Alagona et al. 2012; Worster 1994; Head 2011; O'Gorman 2021). Through a focus on conservation behaviour, this research might expand this conversation into the relatively unstudied realm of species identities and animal behaviour, engaging with scholarship from a variety of disciplines that has explored the ontogenetic and evolutionary processes that produce living beings and their forms of life, including work in philosophical ethology (Chrulaw 2010; Lestel 2011), anthropology (Ingold and Palsson 2013), and developmental systems theory (Oyama et al. 2001; Avital and Jablonka 2000). Of particular interest in this regard, however, is the need to develop new—dynamic and relational— notions of species identity and individual animal identity that account for the fact that both are always changing, and that support animals' efforts to do so in a world that is itself rapidly changing, but that take up the ongoing challenge of determining which kinds of changes are life-affirming, for whom, and at whose expense (van Dooren 2016).

3.3. Redoing Ethics

Projects like the 'olfactory camouflage' mentioned above contribute to a general sense in the conservation behaviour literature, or at least a hopefulness, that these interventions might produce less harm through the development of innovative non-lethal approaches to conservation and wildlife management (as well as potentially being more effective at achieving the desired goals). Far from being a space free of ethical challenges, however, a host of new questions are raised here. In this context, there is a vital role for environmental humanities research in asking how ethical considerations are being taken up, responded to, and transformed through these emerging conservation practices. What new vocabularies and approaches are required here? How are ethical considerations already animating and informing work in conservation behaviour?

When conservation efforts move from 'simply' killing problematic animals to intervening in their behaviour, the ethical terrain shifts substantially. Importantly, non-lethal approaches are not necessarily harm-free. For example, in the case of olfactory camouflage, while this approach may lead to a reduction or end to the poisoning of cats and other predators, this research required the use of dead gulls, quails, and chickens to produce the scent used to protect other birds (Norbury et al. 2021, p. 5). In more extreme contexts, conservation interventions that seek to deny animals access to prey they once consumed may also lead to hunger, starvation, and even death (van Dooren 2019, pp. 137–72). For others, new forms of captivity and exploitation will be required, including the use of a wide range of surrogate non-endangered species to test interventions in areas that range from predator avoidance to assisted migration. In short, diverse forms of dying and manufactured disposability continue and emerge anew in these practices, albeit often pushed into the background and rendered invisible.

At the same time, efforts to engage with the behavioural complexity of animals in this way render *more visible* some potential new forms of psychological and social harm (van Dooren 2019, pp. 137–72). From elephants to parrots, researchers are documenting the occurrence of psychological and social disorders as a result of animals inhabiting disturbed environments (Bradshaw et al. 2005; Langford 2017). Even snails seem to experience stress and a reduced capacity to learn as a result of changes to their social situation (Lukowiak et al. 2014). How might proposed behavioural interventions—including non-lethal ones, some of which are grounded in ongoing forms of hazing, displacement, stress, and fear—potentially give rise to these kinds of harm? In many cases, these ethical questions interface directly with issues of conservation efficacy. For example, elephants suffering from trauma have

been shown to be more likely to be involved in human/wildlife conflicts; importantly, the wellbeing of local people is also often impacted negatively by these conflicts (Jadhav and Barua 2012). Taking these considerations seriously might ultimately still lead us to conclude that behavioural interventions are preferable to more traditional lethal approaches—which, in addition to killing many animals, might also produce higher levels of trauma for those animals that survive—but these are topics that require ongoing, case-specific interrogation.

These questions are made even more complex in the context of conservation behaviour interventions that seek to alter animal behaviour at a landscape level. In these cases, it is often difficult or impossible to predict, let alone control, which animals, of which species, will be exposed to a given intervention. For example, an approach trialled in fish farms to prevent seals from eating fish through the nets has used a device that plays an unpleasant sound, described by one scientist as a seal's version of 'fingernails on a chalkboard' (Wang 2022). However, research has since shown that toothed whales were even more sensitive to this particular sound and less likely to adjust to it than the seals (Götz and Janik 2013). As a result, these whales may be more prone to abandoning the area and so more impacted upon than the target animals. These unintended impacts of conservation behaviour interventions might be thought about as a kind of 'behavioural bycatch' (van Dooren et al. 2023).

As is clear from many of these examples, the ethical questions at stake here involve human communities in a range of ways. Put simply, new ways of understanding and interacting with animals can have profound consequences for the many humans that interact and live with them. As has now been well documented, efforts to conserve 'wild nature' and biodiversity have very frequently excluded local communities from their lands or constrained their livelihoods or traditional cultural practices in unequal, and frequently unnecessary, ways (West et al. 2006). In many other cases, the conservation of threatened species has significantly curtailed the ability of local communities to harm or kill 'problematic' animals, which may threaten their lives and livelihoods in significant ways (including predation of crops, livestock, and humans), giving rise to significant instances of human/wildlife conflict (Woodroffe et al. 2005; Pooley et al. 2017). Some conservation behaviour interventions have the potential to reduce these kinds of conflicts. In fact, one of the key promises of this field is that it might open up spaces for something like the opposite of the 'fortress conservation' (Brockington 2002) approach, which seeks to strictly separate humans from nature. Instead, new kinds of *co-habitation* might be possible, perhaps enabled by aversive training approaches that use frightening or painful experiences to encourage animals not to visit areas where they come into conflict with people or not to prey on livestock (Blackwell et al. 2016; Snijders et al. 2019). Or, if not *co-habitation*, at least closer habitation; perhaps separated by a bee fence or a bio-fence. In many of these cases, however, local human communities will be required to bear the risks associated with the trialling and development of behavioural approaches to conservation (van Dooren et al. 2023). This situation will inevitably open up other kinds of ethical challenges for this emerging field to navigate.

Importantly, however, in many of these contexts, we will need to keep in mind who is being asked to change and who is being enabled to continue their existing modes of life. In many countries in the Global North, both biodiversity loss and human/wildlife conflict stem predominantly from human activities that might readily be conducted otherwise. In the case of human/wildlife conflict, poor urban planning and irresponsible waste disposal are key culprits. When conservation behaviour approaches are deployed in contexts like this, scientists are effectively working to modify animal behaviours because the behaviours of certain human communities and individuals are both so destructive and so resistant to change (van Dooren 2019, pp. 137–72). As such, it is important that these interventions—especially ones that impact significantly on animals—do not end up being used to simply avoid, or bypass (Wang 2019), the more difficult work of human social and economic change.

In taking up these ethical questions, environmental humanities research on conservation behaviour might contribute in a significant way to the growing bodies of literature in

animal studies, animal and environmental ethics, multispecies studies, and conservation and society. In particular, this work might begin to develop new approaches to teasing out the diverse and multifaceted forms of both wellbeing and harm that cut across animal and human lives, taking a broad range of bodily, psychological, social, cultural, and environmental forms. How might this kind of knowledge be incorporated into both ethical theorising and conservation practices? One key element of what is required here is an expanded ethical vocabulary that considers the *active* (even if always uneven) roles of humans and animals in the shaping of relationships and worlds, going beyond topics like suffering to consider ‘resistance’, ‘power’, ‘diplomacy’, and ‘etiquette’ in the co-shaping of lives that are lived at the edge of extinction (Haraway 2008; Chrulew 2011; Warkentin 2010; Palmer 2003; van Dooren 2019).

3.4. Redoing Loss

The final domain in which this research might make a significant contribution is in efforts to understand and more fully articulate the diverse forms of loss that take place in, and around, extinction. In attending to thicker and more complex forms of animal life, work in the field of conservation behaviour arguably also reframes our sense of what is lost in extinction. Alongside the loss of fleshy organisms, extinction is revealed as a loss of diverse modes of perceiving, understanding, and perhaps experiencing, in some cases including ways of mourning, caring, and relating to social partners (Crist 2013; Chrulew 2020; van Dooren 2014). As Despret has succinctly put it in her discussion of the extinction of the passenger pigeon: ‘When a being is no more, the world narrows all of a sudden, and a part of reality collapses. Each time an existence disappears, it is a piece of the universe of sensations that fades away’ (Despret 2017, p. 220). Of course, what is lost is not only the currently existing realities but all of the lively possibilities for what these species might have become in the fullness of evolutionary time (van Dooren 2014, pp. 21–44).

In this context, environmental humanities research in this area might explore how the practices and insights generated by attending to shared human/animal worlds of meaning could *redo our sense of what is being lost in extinction*, opening up a new and deeper appreciation of this process and its significance. While some scholars have explored the impact of species loss on human cultures, kinship systems, livelihoods, languages, and more (Sodikoff 2012; Maffi 2004), research in the proposed area has the potential to open this exploration into the broader spaces of animal meaning, experience, subjectivity, and more that are also at stake here, including in their entanglements with diverse human forms of life and meaning-making. In doing so, this work might contribute to ongoing work in ‘extinction studies’ (Rose et al. 2017) that is seeking to develop a fuller sense of what conservation and extinction mean, how they are experienced, and why they matter, for all of the diverse living beings, human and not, caught up in these processes. Doing so requires attending not only to loss and unravelling—‘the withering of shared life’ (Lestel 2013)—but also to the many new relationships and possibilities that are crafted and ushered into existence here. In short, thinking through the relationships taking form in conservation behaviour interventions provides a novel opportunity to ask: how can attending to shared worlds of meaning transform our understandings of what extinction is, why it matters, and how and why we ought to seek to prevent it? These are vital questions for this period of escalating biodiversity loss.

At the same time, however, there is an important sense in which attention to the intellectual, emotional, and social lives of animals might also lead to new calls to allow, or perhaps even encourage, some species to become extinct. This is particularly the case in relation to species for whom it seems to simply no longer be possible to provide the basis for flourishing forms of life. As the habitats of some species become fractured and unviable, as others are confined to diminished captive environments for generation after generation, at what point should we say that the price of conservation is too high? While some scholars and activists have long opposed captivity and other forms of intrusive conservation, within the conservation community discussions about when species should

be allowed to go extinct have largely been framed as questions of ‘triage’ informed by purely economic cost/benefit analyses, and they remain highly controversial, giving rise to ongoing accusations of ‘playing god’ (Wilson and Law 2016). Almost entirely absent from these discussions, however, are questions of animals’ wellbeing and their capacities to lead flourishing lives. As we gain a greater appreciation of the richness of animal life—and as that understanding makes its way into the conservation community in this new and practical manner—how might this discussion be transformed? How should it be? At the same time, what are the dangers of opening up a public debate about the merits of abandoning species to extinction ‘for their own good’?

4. Conclusions

As a field, conservation behaviour is very much still in formation. Most of the work happening in this area is thoroughly experimental. At the same time, however, given the rapid pace of biodiversity loss today, many of these experiments are active conservation efforts, some of them taking place at large scales. Rather than being a space in which tried and tested approaches are rolled out, even with ongoing monitoring and adaptive management, conservation behaviour interventions are often pushing at the edges of contemporary scientific understandings of animal life. This is an exciting domain, one that may potentially offer a range of valuable new approaches to conservation, as well as new challenges, questions, and risks.

In this article, I have aimed to show that this is also a space that is full of possibilities for environmental humanities scholars. On the one hand, there are possibilities associated with helping to shape an emerging field of conservation practice through a thorough engagement with the complex ethico-onto-epistemic challenges to which it is giving rise. The approach to these questions that I have outlined here moves beyond the application of pre-existing frameworks to instead draw out and respond to as broad a range of questions, challenges, and obligations as possible. This is an approach that must be grounded in a ‘situated’ (Haraway 1991) engagement with specific case study sites, with the particular species, local communities, and landscapes that are at stake in these interventions. In short, it is a space that refuses the allure of definitive answers that can easily be applied across diverse contexts. As the field of conservation behaviour continues to take shape, I hope that these dialogues might enrich the forms that it takes. There are at least some promising early signs that this is possible (van Dooren et al. 2023). On the other hand, I have also argued that an engagement with conservation behaviour has the potential to provide both fruitful case studies, and fascinating collaborators, that offer valuable vantage points on a range of thematic areas that are of ongoing interest to humanities scholars. I have broken these down into areas of agency, identity, ethics, and loss, but it is clear that the overlaps between these topics are considerable, and there are no doubt also other important domains worth considering.

Ultimately, this article offers more questions than answers. It aims to flesh out both an approach and a range of questions to be further explored in relation to the emerging field of conservation behaviour. In so doing, my hope is that this article might prove useful to scholars in the environmental humanities—including those drawn to the area of conservation humanities—who are interested in further exploring this particular field of conservation practice, as well as all those with a broader interest in how engaging with the conservation sciences might enrich both of our fields of enquiry while generating new possibilities for shared life in multispecies communities.

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Notes

- ¹ As has long been explored in the field of biosemiotics (Hoffmeyer 1996; Sebeok and Umiker-Sebeok 1990), all living beings—including plants, fungi, and bacteria—are involved in their own forms of meaning-making: taking in information about the world and responding. While there is no doubt scope within to explore how the questions and approaches outlined in this article reach beyond the animal kingdom, for the sake of conceptual coherence, maintaining a manageable scope of inquiry, and connecting to existing scientific and conservation efforts, I have limited the scope of this article to a focus on animal life.
- ² A few examples that I have engaged with or found inspirational for my own research include the work in comparative cognition of Nicola Clayton and colleagues (Seed et al. 2009; Emery and Clayton 2004); Thomas Bugnyar and colleagues' work on the social lives and strategies of corvids (Bugnyar 2013; Bugnyar 2011); the broad body of work of the primatologist Frans de Waal, including his popular writing (de Waal 2016); Marc Bekoff's work on animal emotions and sociality (Bekoff 2007); the work of John Marzluff, Kaeli Swift, and others on how animals make sense of and relate to the dead (Swift and Marzluff 2015) and learn about threatening people (Marzluff et al. 2010); and the work of Sarah Dalesman and Ken Lukowiak on social isolation, stress and memory in pond snails (Dalesman and Lukowiak 2012).
- ³ On the complex and contested space of domestication, see (Swanson et al. 2018).
- ⁴ Two standout examples from Francophone scholars, recently made available in English, are from Vinciane Despret (Despret 2021) and Baptiste Morizot (Morizot 2022). The emerging field of ethnoprimateology also represents another, relatively taxonomically specific, exception (Fuentes 2012; Parathian et al. 2018).

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